Measuring progress
in the Conservation of Crop Diversity

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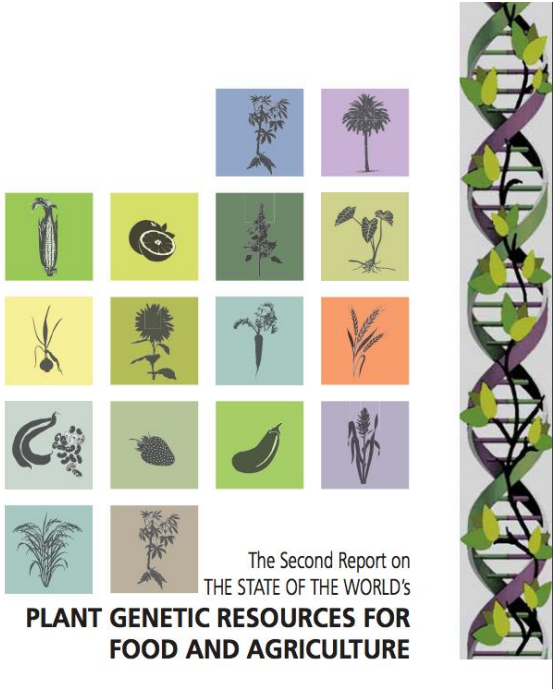
Rolling Global Plan of Action on PGRFA

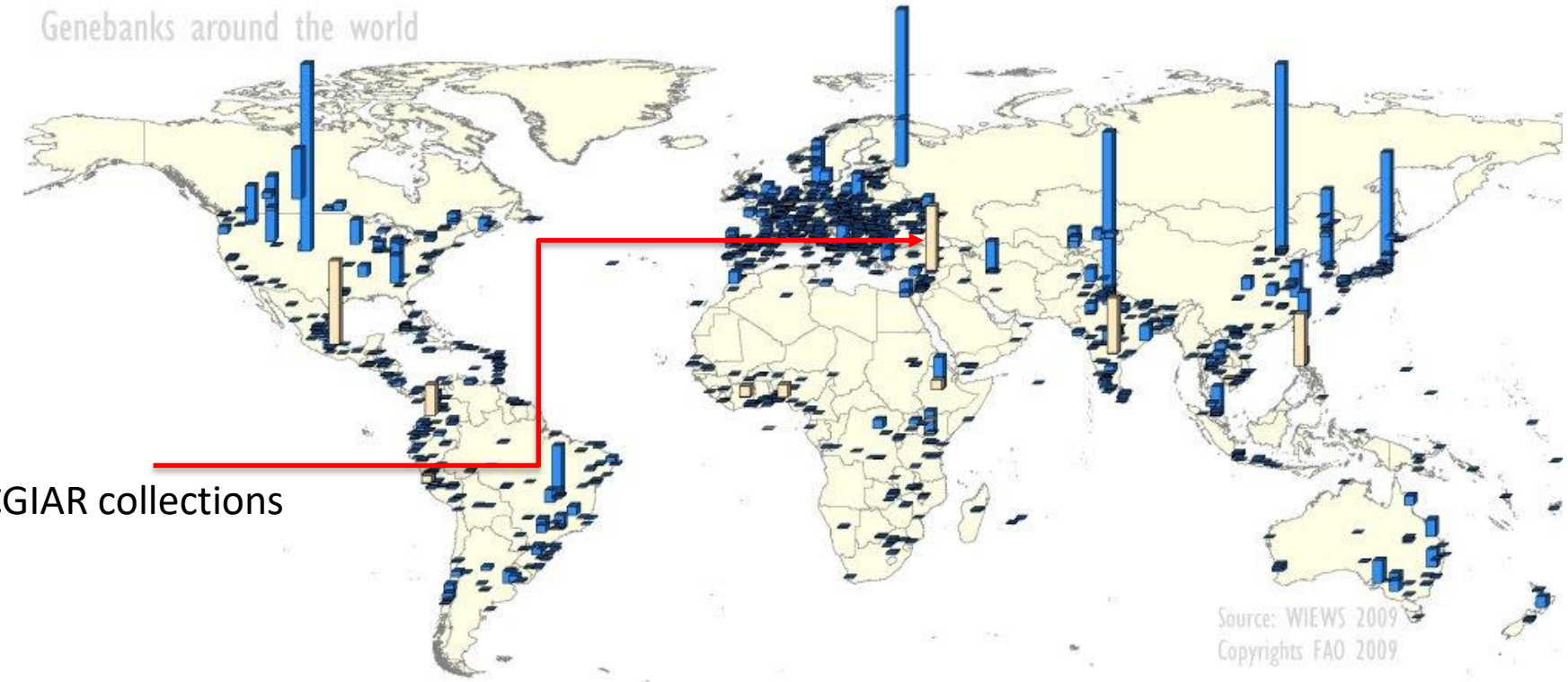


- Process managed by FAO on behalf of the Commission on Genetic Resources
- **2nd State of the World's PGRFA** - 26 October 2010
- **2nd Global Plan of Action** - November 2011
- Genebank Standards - 2014

Where were we then?

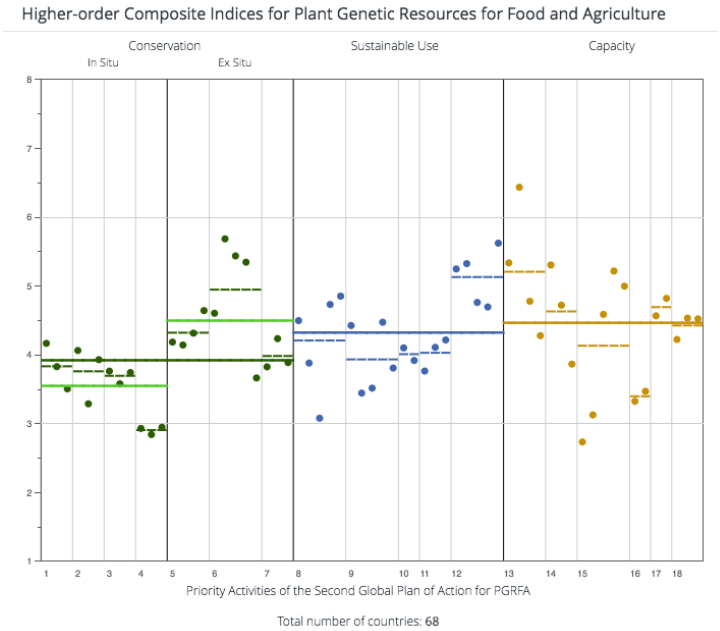
- 7.4 million PGRFA accessions
  - **1.4 million > than 10 years before**
  - **ca. 1.9-2.2 million unique**
- 1,750 genebanks
  - **130 with >10,000**
  - **11 international collections (CGIAR)**
- Svalbard Global Seed Vault

https://tour.croptrust.org/



CGIAR collections

Where are we now?



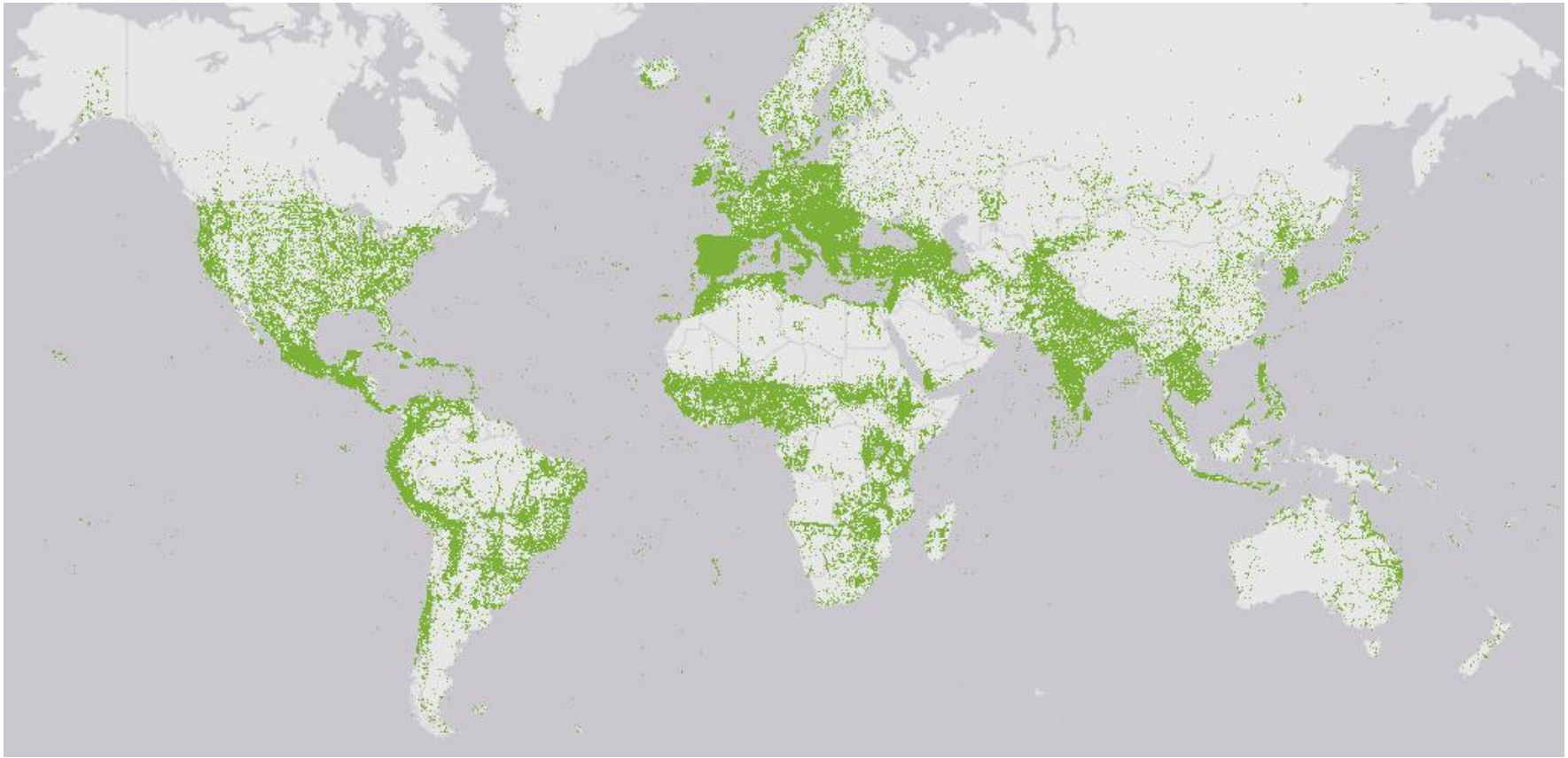
http://www.fao.org/wiews/en/

- 63 indicators (+reporting format) to monitor implementation of 18 priority activities of 2nd GPA

  ✓ "Indicators take into account Strategic Plan for Biodiversity 2011-2020, including Aichi Biodiversity Targets."

- National Focal Points report online to FAO World Information & Early Warning System (WIEWS), or via Genesys (accession numbers)

  ➞ 3rd State of the World's PGRFA



Genesys

https://www.genesys-pgr.org/welcome

The Genebank Platform

CGIAR Genebank Platform

https://www.genebanks.org/

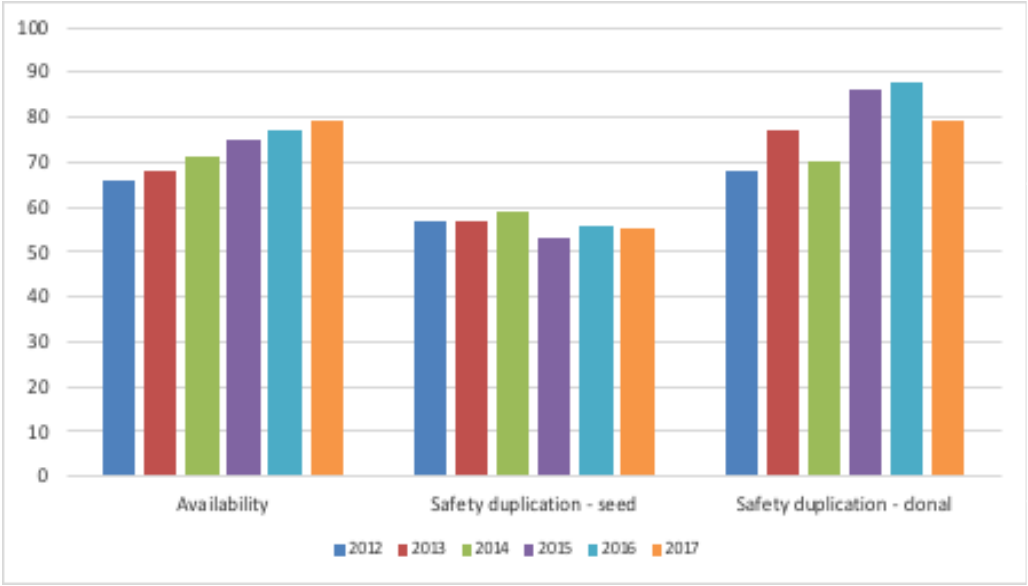
11 International Genebanks 2012-2015

749,656 accessions

- **717,205** seed
- **23,529** tissue culture
- **27,763** whole plants

- **479,819** samples distributed **(157 countries)**
- **271,428** accessions regenerated
- **193,662** health tested
- **304,095** viability tested
- **2,568** collected
- **905** cryobanked

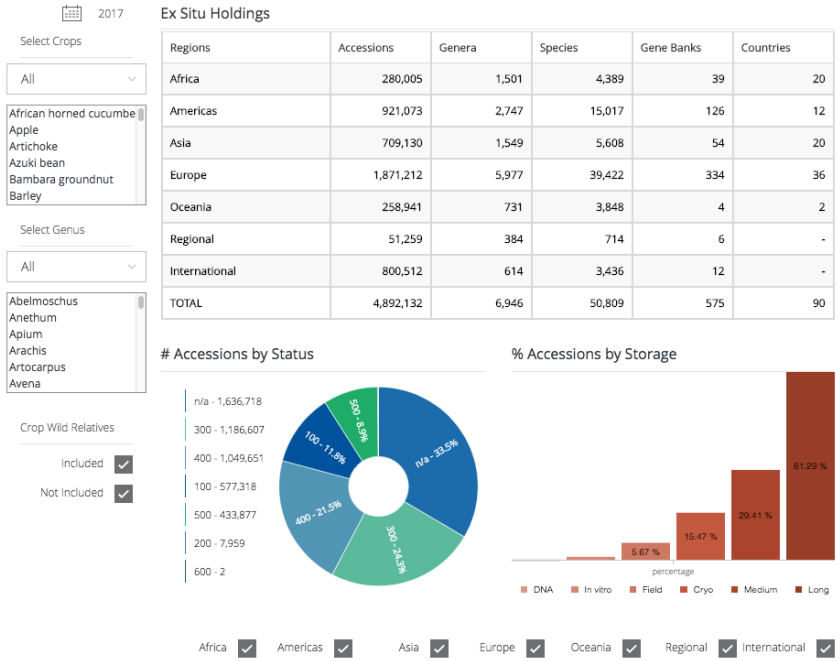
11 International Genebanks



Key performance indicators

	Indicators	Targets
1	Availability % collection which is clean of pathogens of quarantine risk, viable, and in sufficient quantity to be immediately available for international distribution from medium-term storage	90% accessions available
2	Security **For seed crops**: % collection held in long-term storage at 2 locations and also in Svalbard Global Seed Vault (except for tree spp) **For clonal crops**: % of the collection held in long-term storage or cryopreservation at 2 locations; % of the collection held in slow growth conditions *in vitro* at two locations	90% accessions in seed collections safety duplicated 50% clonal accessions in cryopreservation 90% clonal accessions duplicated in *in vitro*
3	Data availability % collection with minimum passport and/or characterization data online	90% accessions documented
4	Quality Management System	Agreed elements of QMS are in place

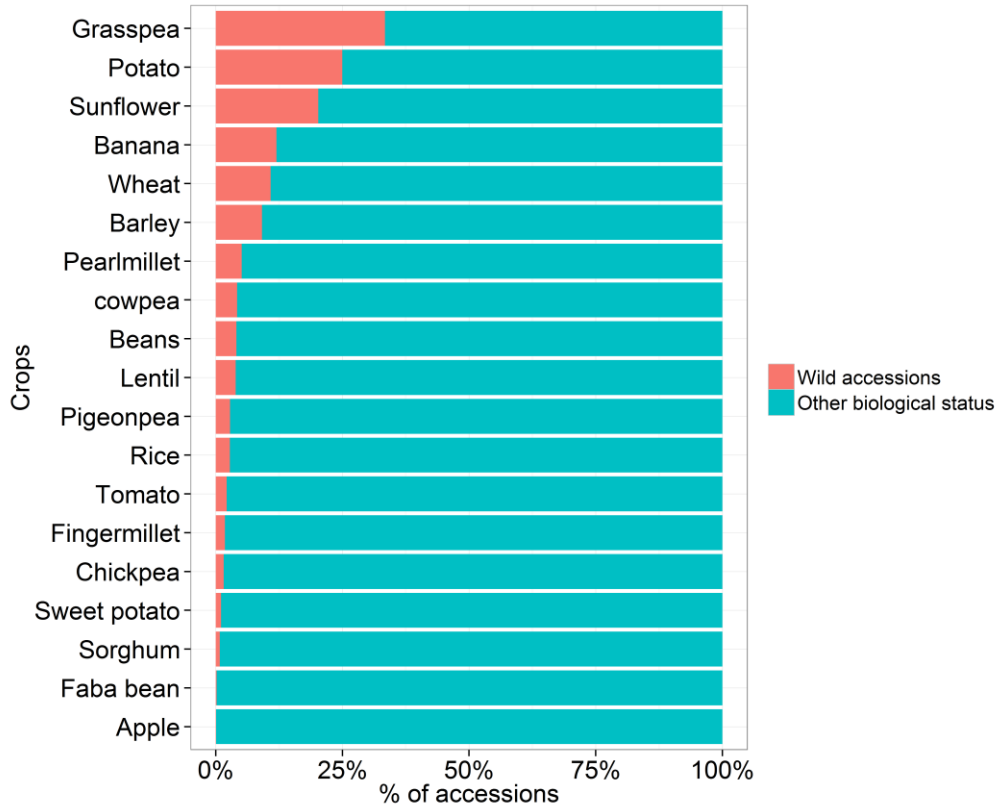
SDG 2.5.1 from WIEWS



Regions	Accessions	Genera	Species	Gene Banks	Countries
Africa	280,005	1,501	4,389	39	20
Americas	921,073	2,747	15,017	126	12
Asia	709,130	1,549	5,608	54	20
Europe	1,871,212	5,977	39,422	334	36
Oceania	258,941	731	3,848	4	2
Regional	51,259	384	714	6	-
International	800,512	614	3,436	12	-
TOTAL	4,892,132	6,946	50,809	575	90

Number of plant and animal genetic resources for food and agriculture secured in either medium or long term conservation facilities.

http://www.fao.org/wiews/en/


Grasspea
Potato
Sunflower
Banana
Wheat
Barley
Pearlmillet
cowpea
Beans
Lentil
Pigeonpea
Rice
Tomato
Fingermillet
Chickpea
Sweet potato
Sorghum
Faba bean
Apple
Crops
0%
25%
50%
75%
100%
% of accessions
Wild accessions
Other biological status

The ‘CWR Project’:

Collecting, Protecting and Preparing Crop Wild Relatives

- Supported by Norwegian Government from climate change adaptation funds
- $50 million, 10 years
- 29 crop genepools (ITPGRFA Annex 1)
- Started in Jan. 2011
- Partnership with Millennium Seed Bank, Kew

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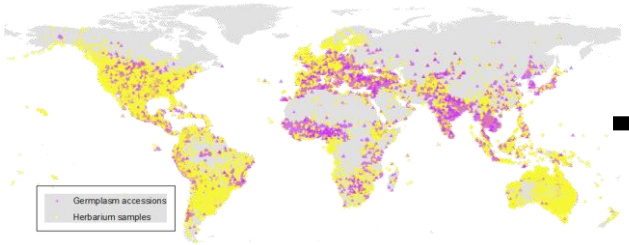
MILLENNIUM SEED BANK PARTNERSHIP Kew

crop wild relatives



Global gap analysis:
Priority setting for collecting

Support national genebanks
in collecting and conservation

Pre-breeding and evaluation
partnerships for climate
change adaptation

Organize taxonomic data

Collate occurrences

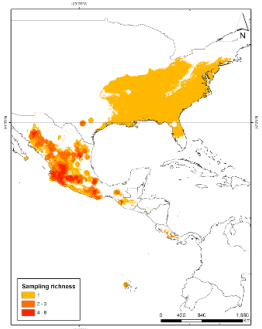
Geo-reference

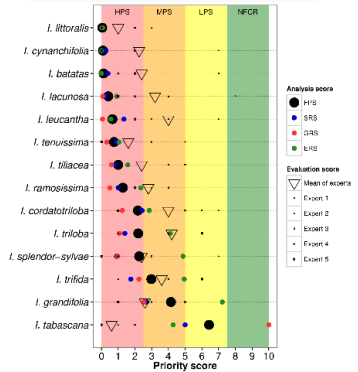
MaxEnt

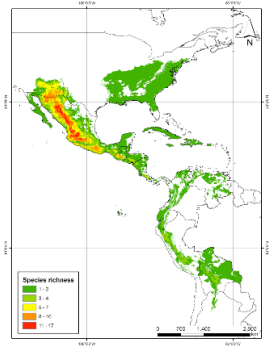
Model distributions

Determine gaps in collections

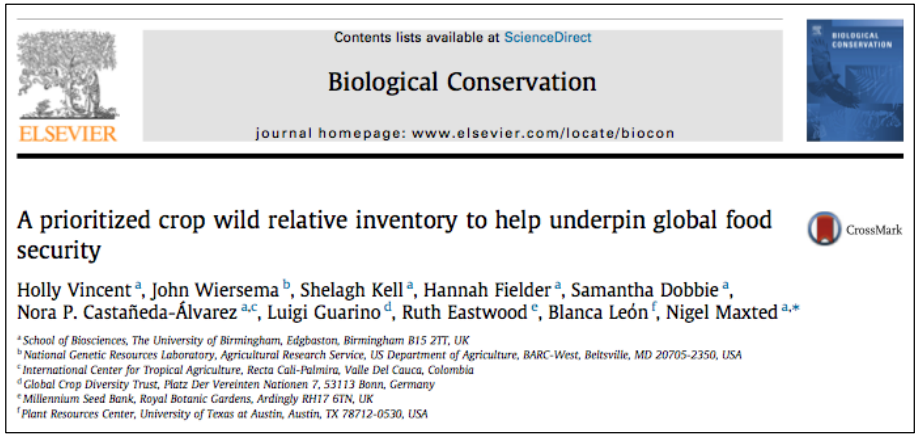
Make collecting recommendations







Organize taxonomic data



Contents lists available at ScienceDirect

Biological Conservation

journal homepage: www.elsevier.com/locate/biocon

A prioritized crop wild relative inventory to help underpin global food security

Holly Vincent [a], John Wiersema [b], Shelagh Kell [a], Hannah Fielder [a], Samantha Dobbie [a], Nora P. Castañeda-Álvarez [a,c], Luigi Guarino [d], Ruth Eastwood [e], Blanca León [f], Nigel Maxted [a,*]

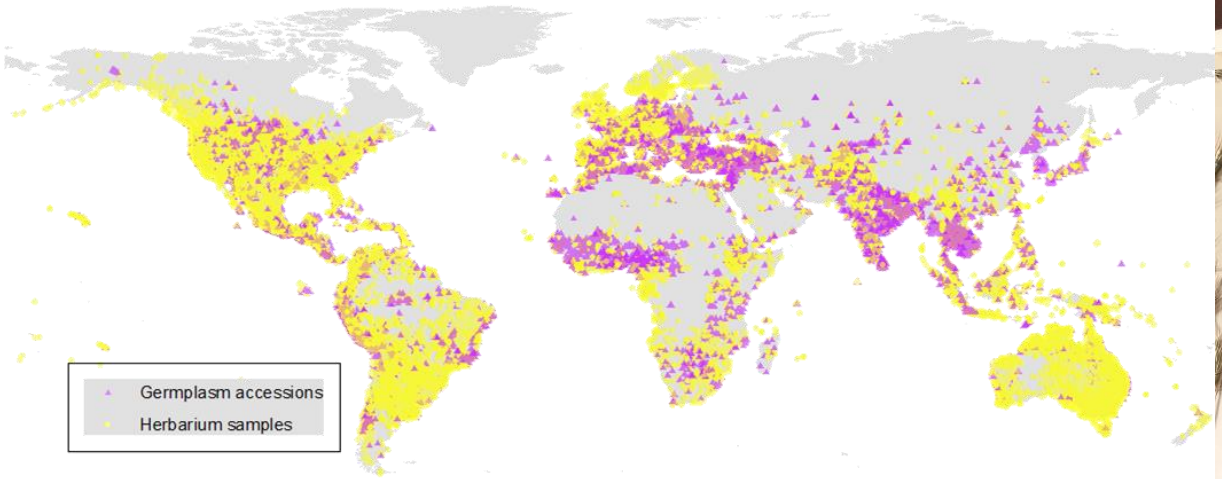
[a] School of Biosciences, The University of Birmingham, Edgbaston, Birmingham B15 2TT, UK
[b] National Genetic Resources Laboratory, Agricultural Research Service, US Department of Agriculture, BARC-West, Beltsville, MD 20705-2350, USA
[c] International Center for Tropical Agriculture, Recta Cali-Palmira, Valle Del Cauca, Colombia
[d] Global Crop Diversity Trust, Platz Der Vereinten Nationen 7, 53113 Bonn, Germany
[e] Millennium Seed Bank, Royal Botanic Gardens, Ardingly RH17 6TN, UK
[f] Plant Resources Center, University of Texas at Austin, Austin, TX 78712-0530, USA

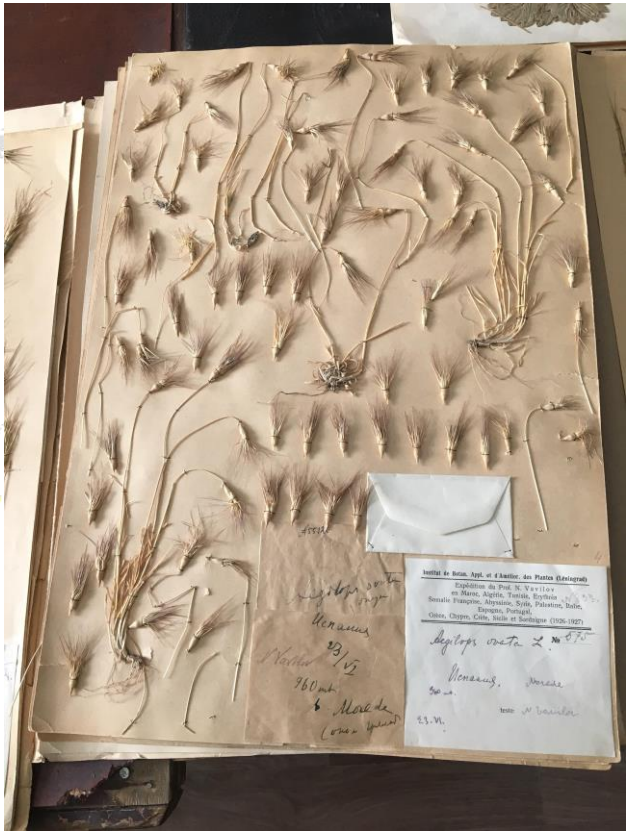
- 81 crop genepools globally important for food security
- 1079 crop wild relative taxa (GP1 and GP2 + less closely related taxa with proven and potential uses in breeding)

https://www.sciencedirect.com/science/article/pii/S0006320713002851

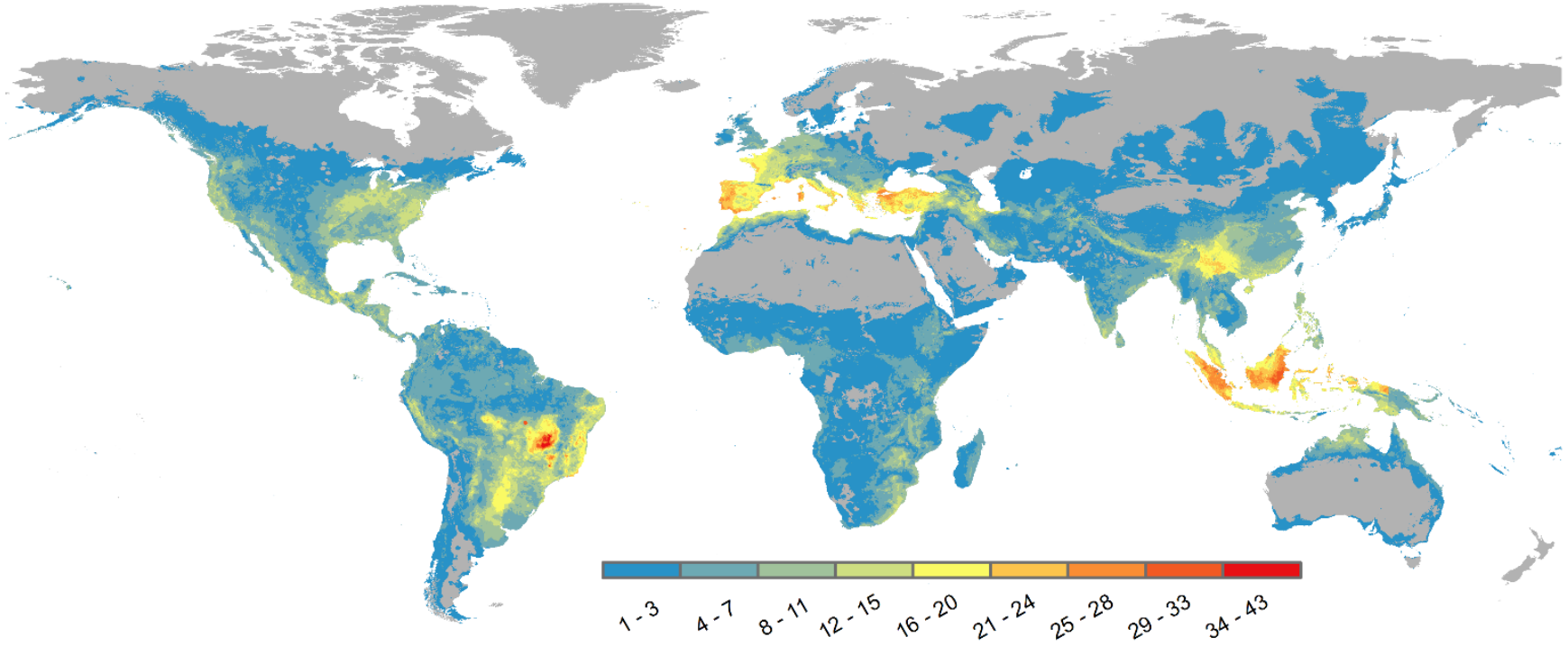
Collate occurrences

Geo-reference

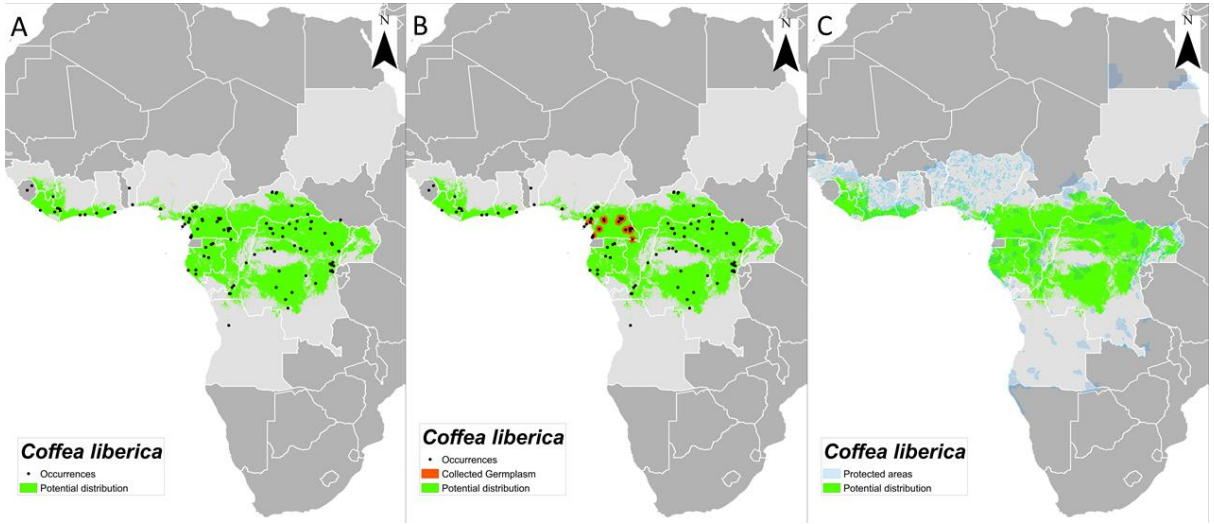




Collating & curating occurrence data from 420 sources

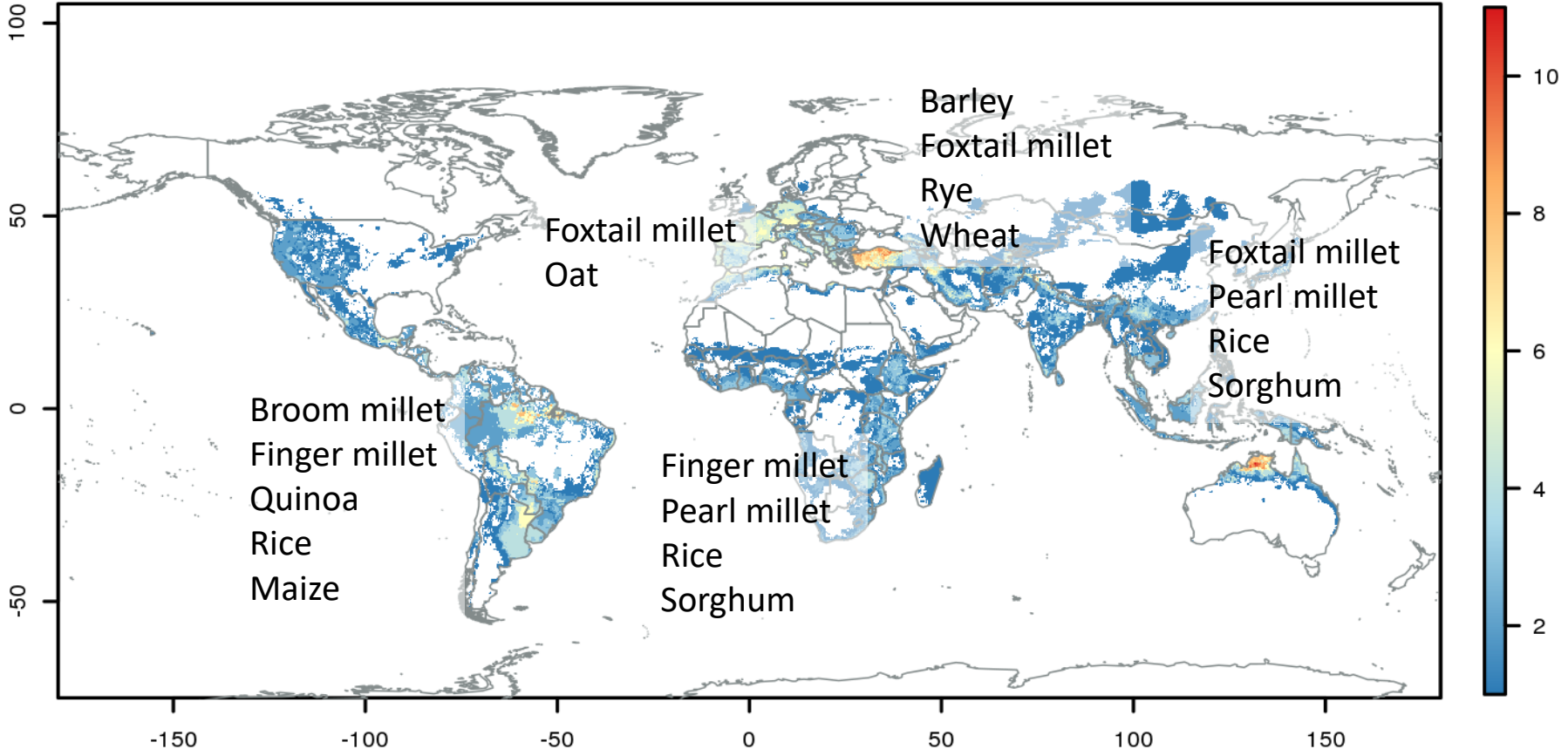


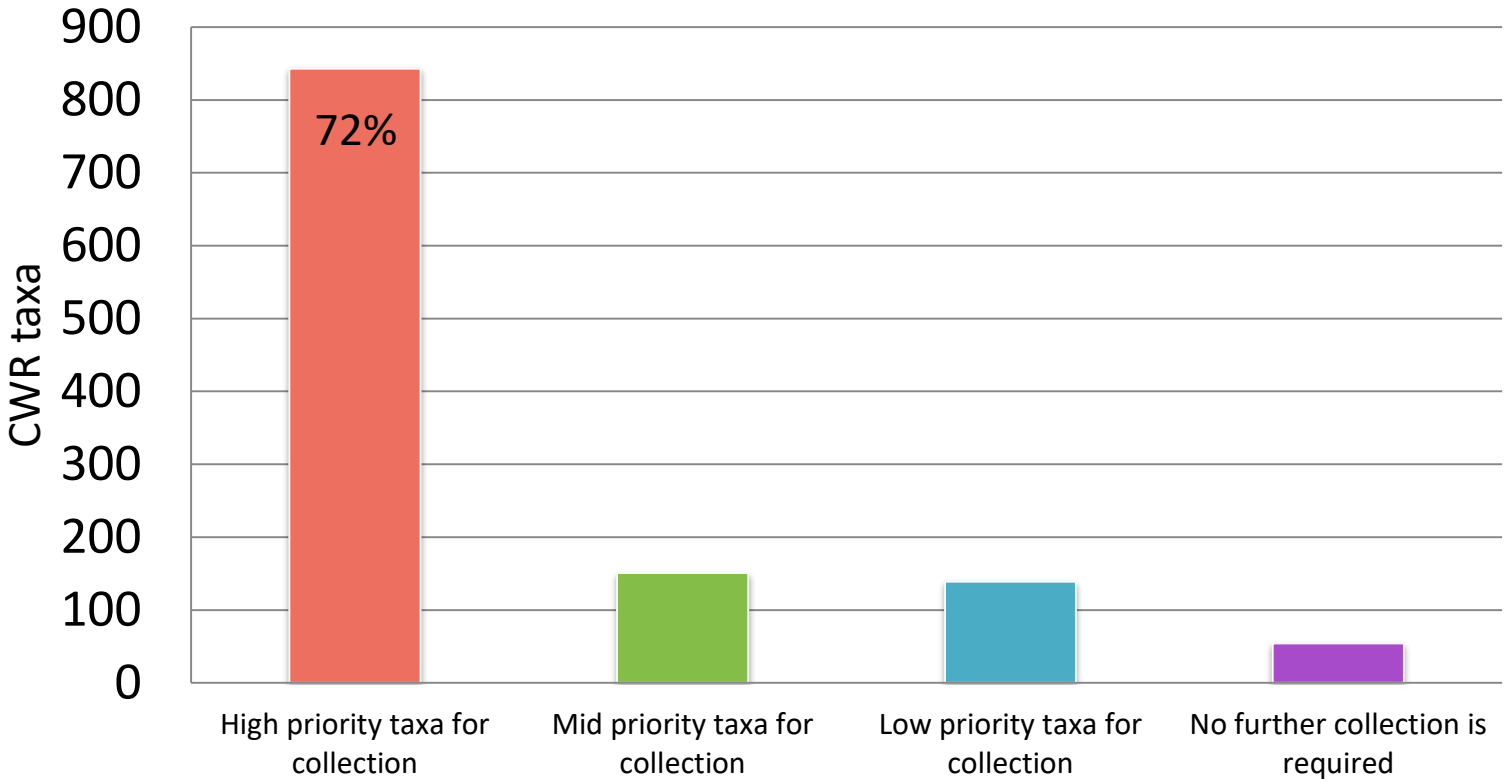
Model distributions



Determine gaps in collections

http://journals.plos.org/plosone/article?id=10.1371/journal.pone.0013497


Barley
Foxtail millet
Rye
Wheat
Foxtail millet
Oat
Foxtail millet
Pearl millet
Rice
Sorghum
Broom millet
Finger millet
Quinoa
Rice
Maize
Finger millet
Pearl millet
Rice
Sorghum
100
50
0
-50
-150
-100
-50
0
50
100
150
10
8
6
4
2


900
800
700
600
500
400
300
200
100
0
CWR taxa
72%
High priority taxa for collection
Mid priority taxa for collection
Low priority taxa for collection
No further collection is required

Global conservation priorities for crop wild relatives

Nora P. Castañeda-Álvarez ✉, Colin K. Khoury, Harold A. Achicanoy, Vivian Bernau, Hannes Dempewolf, Ruth J. Eastwood, Luigi Guarino, Ruth H. Harker, Andy Jarvis, Nigel Maxted, Jonas V. Müller, Julian Ramirez-Villegas, Chrystian C. Sosa, Paul C. Struik, Holly Vincent & Jane Toll

Nature Plants Article number: 16022 (2016)
doi:10.1038/nplants.2016.22

Received: 04 September 2015
Accepted: 05 February 2016

Make collecting recommendations

https://www.cwrdiversity.org/resources/

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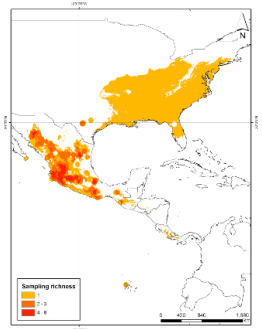
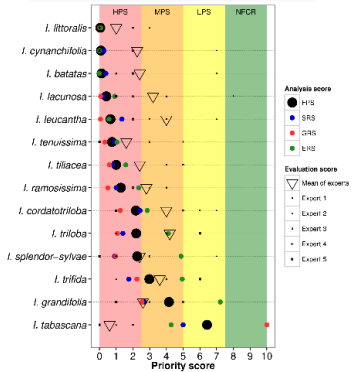
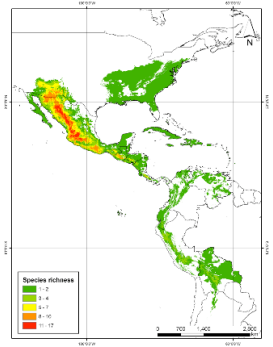


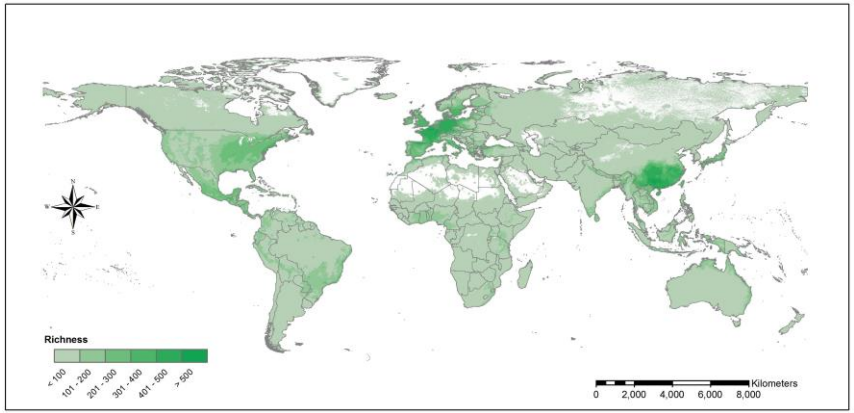




Crop wild relatives conservation

- *Ex situ* (global) 28% of CWR spp adequately conserved
  - Castañeda et al (2016) https://www.nature.com/articles/nplants201622
- *In situ* (global)
  - Vincent (in review)
- Interactive Toolkit for Conservation Planning of CWR
  - http://www.cropwildrelatives.org/conservation-toolkit/
- National level http://www.cropwildrelatives.org/cwr-strategies/
  - Checklist and inventories in 29 countries
  - strategies in 8 countries/regions
  - NSAPs for 3 countries

Socioeconomically valuable wild species



- Automated pipeline applied to about 7000 socioeconomically and culturally valuable wild species (Aichi 13)
- Both *ex situ* and *in situ* gaps
- Results in peer review
- Interactive website

https://github.com/CIAT-DAPA/aichi13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